

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part I CBCS syllabus with effect from June ,2018

Semester: I Botany - Paper I

BOTANY- DSC 1007 A

“ Biodiversity in Cryptogams and Gymnosperms ”

Theory: 60 Hours (75 Lectures) Credits: 4

Section – I

Biodiversity in Microbes, Algae and fungi

- Unit: 1. Microbes:** 07 hrs
- 1a: Virus:** Discovery, General Characters, DNA virus (T Phage) and RNA virus (TMV), Economic importance.
- 1b. Bacteria-** Discovery, General Characters, Cell structure, Types, Mode of reproduction Asexual (Binary fission & Budding), Sexual (Conjugation), Economic importance.
- Unit.2: Algae and Fungi:** 23 hrs
- 2a. Algae:** General Characters, Classification (As per G. M. Smith) up to class (10 hrs) with characters and suitable example. Economic importance. Morphology and Life Cycle (Excluding developmental stages) of
- a. Cyanophyceae- *Nostoc*
 - b. Chlorophyceae- *Spirogyra*
 - c. Algal biofertilizers and its importance
- 2b. Fungi:** General Characters, Classification (As per Ainsworth) up to class. (10 hrs) with characters and suitable example. Economic importance, Morphology and Life Cycles (Excluding developmental stages) of
- a. Zygomycotina- *Mucor*
 - b. Ascomycotina –*Penicillium*
 - c VAM fungi & its importance
- 2c. Lichen:** Definition, structure of thallus, types, reproduction & economic importance. (03 hrs)

Section – II

Bryophytes, Pteridophytes and Gymnosperms (Archegoniate)

Unit. 3: Bryophytes and Pteridophytes

3a. Bryophytes

(10 hrs)

General characters, Adaptation to land habit, Classification (As per G. M. Smith) upto class, Alternation of Generation, Economic importance.

Morphology, Anatomy and Life Cycle (Excluding developmental stages)

Hepaticopsida - *Riccia*

Anthocerotopsida- *Anthoceros*

3b. Pteridophytes

10 hrs

General characters, Classification (As per G. M. Smith) upto class.

Morphology, Anatomy & Life Cycle (Excluding developmental stages) of

a. Lycopsida- *Selaginella*

b. Pteropsida - *Pteris*

c. Heterospory and seed habit in Pteridophytes

Unit. 4: Gymnosperms

10 hrs

4a .General characters, Classification (As per Sporne, 1965) upto Class

General characters of class with suitable examples. Economic importance of gymnosperms.

4b. Morphology, Anatomy and Life Cycle (Excluding developmental stages) of *Cycadopsida*- *Cycas*.

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Semester: II Botany - Paper II

BOTANY- DSC 1007 B

" Plant Ecology and Taxonomy "

Theory: 60 Hours (75 Lectures) Credits: 4

Section – I

- Unit. 1. Ecological factors and Plant communities** 15 hrs
- 1a. Introduction and definition of Ecology
 - 1b. Ecological factors:
 - i. **Edaphic factors**- Soil: Origin and formation. Composition- soil water, soil air, soil temperature, soil organic matter and soil microbes.
 - ii. **Climatic factors**- Light , Temperature, Precipitation , atmospheric humidity and Rainfall
 - iii. **Ecological adaptations** – Hydrophytes , Xerophytes, Epiphytes and Parasites
 - iv. **Soil Pollution** - Preventive and Curative methods
 - 1c **Ecological Succesion**
Introduction, Process of succession ,Types of succession - Hydrosere , Xerosere.
 - 1d **Ecological Interaction**
Intraspecific interaction (Cooperation, communication, compeition)
and Interspecific interaction (Symbiosis , Commesalism , Parasitism and Predation).
- Unit 2. Ecosystem and Phyto-geography** 15 hrs
- 2a. Ecosystem
Introduction, Composition- Abiotic and Biotic components.
Types of ecosystems – Aquatic and Terrestrial (one example of each type)
Food chain and web.
 - 2b. Biogeochemical cycles- Introduction, Phosphorus and Nitrogen cycle.
 - 2c. Phytogeographical regions of India (as per Chatterjii and Mani).

Section-II

- Unit 3. Plant Taxonomy** 18 hrs
- 3a. Salient features of Angiosperms.
 - 3b. Introduction and Importance of taxonomy
 - 3c. Functions of taxonomy - Identification, Nomenclature and classification.
Binomial nomenclature.
 - 3d. Salient features of International Code of Botanical Nomenclature (ICBN).
 - 3e. Bentham and Hooker's System of classification with its Merits and demerits.

3f. Morphological, floral, distinguishing characters and economic importance of following families.

i. Malvaceae ii. Solanaceae iii. Nyctaginaceae iv. Amaryllidaceae

Unit 4. Morphology and modifications in Angiosperms

12 hrs

4a. Morphology and modification of Root.

4b. Morphology and modification of Stem.

4c. Morphology and modification of Leaf.

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BOTANY Practical - DSC 7A

“ Biodiversity in Cryptogams and Gymnosperms ”

60 Hours (75 Lectures) Credits: 2

1. Study of Forms of bacteria
2. Study of *Nostoc*
3. Study of *Spirogyra*
4. Study of *Mucor*
5. Study of *Penicillium*
6. Study of VAM fungi
7. Study of *Riccia*
8. Study of *Anthoceros*
9. Study of *Selaginella*
10. Study of *Pteris*
11. Study of *Cycas*
12. Algal biofertilizer

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BOTANY Practical - DSC 7 B

“ Plant Ecology and Taxonomy ”

60 Hours (75 Lectures) Credits: 2

1. Study of Water Holding Capacity of different soils
2. Determination of soil pH by Universal Indicator/ pH paper/ pH meter

3. Study of morphological and anatomical adaptations in hydrophytes- *Hydrilla*, *Eichhornia*.
4. Study of morphological and anatomical adaptations in Xerophytes- *Aloe*, *Nerium*.
5. Study of morphological and anatomical adaptations in Epiphytes (Orchid) and Parasites (*Cuscuta*).
6. Study of morphology and modification of Root.
7. Study of morphology and modification of Stem.
8. Study of morphology and modification of Leaf.
- 9- 12. Study of Vegetative and Floral characters of following plant families Malvaceae, Solanaceae, Nyctaginaceae and Amaryllidaceae

Distribution of Marks for B. Sc. I- BOTANY Practical

| Sr. No. | Name of topic | Marks |
|---------|--------------------------------------|-------|
| 1. | Bacteria / Lichen /VAM/Biofertilizer | 04 |
| 2. | Algae | 04 |
| 3. | Fungi | 04 |
| 4. | Bryophyte | 04 |
| 5. | Pteridophytes/ Gymnosperms | 06 |
| 6. | Ecology | 06 |
| 8. | Angiosperm | 06 |
| 9. | Taxonomy | 06 |
| 9. | Journal | 05 |
| 10. | Tour report | 05 |

Details of Practical Examination

A) Every candidate must produce a certificate- from Head of the Dept. in his /her college, stating that he / she has completed practical course in satisfactory manner as per guidelines laid down by Academic Council on the recommendations of Board of Studies in Botany. The student should record his / her observations and report of each experiment should be written in the journal. The journal is to be signed periodically by teacher in charge and certified by the Head of the Department at the end of year. Candidates have to produce their certificate journal and tour report at the time of practical examination. Candidate is not "allowed to appear" for the practical examination without a certified journal / a certificate from Head of the Botany Dept. regarding the same.

B) Practical Examination shall be of Five hours duration and shall test a candidate in respect of the following.

1. Practical study of external and internal structures of different plant types and their classification. Making temporary stained preparations and identification.
2. Identification and setting of physiological and biochemical experiments.
3. Study of plant families as per syllabus,
4. Spotting of the specimens as per syllabus.

Botanical Excursions

One teacher along with a batch not more than 20 students be taken for botanical excursion to places of Botanical interest (Nursery, Botanical garden, Polyhouse). If there are female students in a batch of

twenty students, one additional lady teacher is permissible for excursion. Each excursion will not be more than three days during college working days. T.A. and D.A. for teachers and non-teaching staff participating in excursions should be paid as per rules. Tour report duly certified by teacher concerned and Head of the Department should be submitted at the time of practical examination.

Reference Books :

Algae –

1. Introductory Phycology. H. D. Kumar, 1988, Affiliated East-West Press Ltd., New York.
2. Algae - H. D. Kumar and H. N. Singh (1991)
3. Algae - O. P. Sharma (1986)
4. Algae - B. P. Pandey (1994)
5. A Text book of Algae - G. L. Chopra (1969)
6. A Text book of Algae - H. D. Kumar and H. N. Singh (1977)
7. A Text book of Botany - V. Singh, P. C. Pandey, D. K. Jain (1999)
8. A Text book of Botany Vol. I – S. N. Pandey, S. P. Misra and P. S. Trivedi (1.982)
9. A Treatise on Algae - K. N. Bhatia (1980)

Fungi –

1. A Hand book of Lichens - D. D. Awasthi (2000)
2. An Introduction to Fungi - H. C. Dube (1990)
3. Morphology of Plants and Fungi -- H.C. Blod, Aloxopoulos, G. J. and Delevoryas, T. 1980. (4th Edition) Harper and Foul Co., New York.
4. An Introduction to Fungi.-- H. C. Dube, 1990. Vikas Publishing House Pvt. Ltd., Delhi.
5. Cryptogamic Botany Vol. I & II (2nd Edition), M. S. Gilbert, 1985. Tata Mcgraw Hill Publishing Co., Ltd New Delhi.
6. Fungi- B. R. Vashishtha (1996)
7. Fungi- B. P. Pandey (1994)
8. Introduction to Fungi - Sundrarajan (2001)
9. Introductory Mycology - C. J. Alexopoulos, C. W. Mims, M. Blackwell
10. Cryptogamic Botany Vol. I - Algae and Fungi - G. M. Smith (1974)
11. Hand Book of Organic Farming and Biofertilizers- M. K. Gupta ; ABD Publisher, Jaipur India- 2007.
12. Mushroom - Cultivation, Processing and Uses- B. C. Saman and V. P. Sharma- Agrobios India- 2005.

Bryophytes –

1. Bryophytes. P. Puri, 1985. Amarm & Sons, Delhi.
2. College Botany - S. Sundararajan (1999)
3. College Botany Vol. I - H. C. Gangulee, Das K. S. and Datta C. T. (1991)
4. College Botany Vol. II - H. C. Gangulee and Kar A. K. (1999)
5. College Botany Vol. III -- S. K. Mukharji (1990)
6. Cryptogamic Botany Vol. I- G. M. Smith (1955)
7. Cryptogamic Botany: Bryophytes and Pteridophytes - G. C. Smith (1955)

Pteridophytes—

1. An Introduction to Pteridophytes - A. Rashid (1978)
2. An Introduction to Pteridophyta (Diversity and Differentiation) -A. Rashid (1976)
3. A Text book of Pteridophyte – S. N. Pandey, P. S. Trivedi, S. P. Misra (1995)
4. An Introduction to Embryophyta - N. S. Parihar (1961)
5. Morphology and Evolution of Vascular Plants- E. M. Gifford and A. S. Foster, 1989. W.H. Freeman & Co., New York.
6. Morphology of vascular Plant (lower groups) -- A. J. Eames.
7. Illustrated Manual of Ferns of Assam -S. K. Borthakur, P. Deka, K. K. Nath (2000)

8. Pteridophyta – Vascular Cryptogams - P. C. Vashishta (1972)
9. Botany for Degree Students- Pteridophyta (Vascular Cryptogams) - P. C. Vashishta, A. K. Sinha, Anil Kumar – S Chad – Multicolour Illustrative Revised Edition- 2006.

Gymnosperms –

1. Botany for Degree Students- Gymnosperms (Vascular Cryptogams) - P. C. Vashishta, A. K. Sinha, Anil Kumar – S Chad – Multicolour Illustrative Revised Edition- 2006.
2. The Morphology of Gymnosperms. -- K. R. Sporne, 1991. B. I. Publications Pvt., Bombay, Calcutta, Delhi.
3. Morphology of Gymnosperms -- J. M. Coulter and C. J. Chamberlain.
4. Gymnosperms – Structure & Evolution.-- C. J. Chamberlain
5. Morphology of Gymnosperms.-- K. R. Sporne.
6. Gymnosperms- P. C. Vashishta (1976)
7. Gymnosperms- C. J. Chamberlain (1966)
8. Indian Gymnosperms in Time and Space - C. G. K Ramanujan. (1979)
9. Origin and Evolution of Gymnosperms - Ed Charles B. Beck (2002)
10. Phylogeny and form in the plant Kingdom - H. C. Dittmer (1964)

Angiosperms ---

1. Principles of Angiosperm Taxonomy – P. H. Davis, Heywood V. M. (1963)
2. The evolution and classification of flowering plants. – A. Cronquist, 1968. Thomas Nelson (Printers) Ltd., London & Edinburgh.
3. Plant Diversification. --Delevoryas, Th. 1965 Modern Biology Series, Half Rinehart & Winston, New York.
4. Comparative Morphology of Vascular Plants. - A. S. Foster and Gifford, A.E.M. jr. 1967. Vakils, Peffer & Simons Pvt., Ltd.
5. The Morphology of Angiosperms. -- K.R Sporne, 1977. B.I. Publication, Bombay.
6. The Embryology of Angiosperms. -- S.S. Bhojwani and Bhatnagar, S.P. 2000. 4th revised and enlarged edition. Vikas Publishing House, Delhi.
7. Embryology of Angiosperms. -- B.M. Johri, 1984. Springer-Verlag Berlin.
8. Molecular Embryology of Flowering Plants. -- V. Raghvan, 1997. Cambridge University Press New York.
9. Principles of Angiosperm Taxonomy. -- P.H. Davis and V.H. Haywood, 1963. Oliver and Royd, London.
10. Current Concepts in Plant Taxonomy. -- V.H. Heywood and D.M. Moore 1984. Academic Press, London.
11. Plant Systematics (2nd edition). -- Jones, S.B. Jr. and Luchsinger, A.E. 1986. McGraw-Hill Book Co., New York.
12. Taxonomy of Vascular Plants. -- G.H.M. Lawrance, 1951. MacMillan, New York.
13. Taxonomy of Angiosperms. -- V.N. Naik, 1984. Tata McGraw Hill, New York.
14. Fundamentals of Plant Systematics -- A.E. Radford, 1986. Harper and Row, New York..
15. Plant Systematics: Theory and practice -- G. Singh, 1999. Oxford & IBH Pvt., Ltd. New Delhi.
16. An Introduction to Plant Taxonomy. -- C. Jeffrey, 1982. Cambridge University Press, Cambridge London.
17. Plant Taxonomy and Biosystematics. -- C.A. Stace, 1989. 2nd ed. Edward Arnold, London.
18. Contemporary Plant Systematics. -- D.E. Woodland. 1991. Prentice Hall, New Jersey.
19. Plant Systematics for 21st Century -- B. Nordenstam, El-Gazaly, G. and Kassas. M. 2000. Portland Press Ltd., London.-
20. Embryogenesis in Angiosperms: A Development and Experimental Study.-- V. Raghavan. Cambridge University Press New York. USA. 1986.
21. The flora of the Presidency of Bombay Volume- I, II & III. -- T. Cooke. (1958) Bishen

Singh, Mahendra Pal Singh, Dehradun.

22. Taxonomy of the Angiosperms -- A. J. Eames.
23. Text book of systematic botany. -- R. N. Sutaria.
24. Methods of Descriptive systematic Botany -- A. S. Hitchcock.
25. Flora of Khandala -- H. Santapaun.
26. An Introduction to Embryology of Angiosperms. -- P. Maheshwari.
27. Endemic plants of India - M. Ahmeduilah & Nayar M. P.
28. Biodiversity in India – Floristic aspects -- R. R. Rao – 1995

Ecology --

1. A Text Book of Plant Ecology. -- R.S. Ambasht. 1988 Students Friends Co. Varanasi.
2. Plant Ecology-- J. E. Weaver and F. E. Clements. 1966. Tata McGraw Publishing Co. Ltd. Bombay.
3. Ecology: Principles and Applications - J.L. Chapman and M.J. Reiss, 1995. Cambridge University Press.
4. Methods in Plant Ecology.-- P. W. Moore and S. B. Chapman, 1986. Blackwell Scientific Publication.
5. Fundamentals of Ecology. -- M.C. Dash, 1993. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
6. Plants and Environment- A Text Book of Plant Ecology – R.F. Daubenmire, 1974. (3rd edition). John Wiley & Sons. New York.
7. Elements of Ecology. -- L.R. Smith and T.M. Mith, 1998. (4th edition). An imprint of Addison Wesley, Longman ink., California.
8. Modern Concepts of Ecology (3rd edition). -- H.D. Kumar,1996. Vikas Publishing House Pvt., Ltd. Delhi.
9. General Ecology. -- H.D. Kumar, 1997. Vikas Publishing House Pvt. Ltd., Delhi.
10. Concepts of Ecology.-- .F.J. Kermondy,1996. Prentice Hall of India Pvt. Ltd., New Delhi.
11. Soils-An Introduction to Soil and Plant Growth-- W.R. Miller and Donahue.R.L. 1992. (6th edition). Prentice Hall of India Pvt. Ltd., New Delhil.
12. Fundamentals of Ecology.-- E.P. Odum, 1996. Natraj Publishing, Dehradun.
13. Hot Spots of Endemic Plants of India Burma & Nepal-- M.P. Nayar 1996.
14. Ecology and Field Biology -- L.R. Smith. 1996. (5th edition). Harper Collns College Publishers, USA.
15. Environment and Pollution-- R. S. Ambasht. 1990. Students Friends and Co. Varanasi, India.
16. Experimental Plant Ecology-- P. Kapur and S. R. Govil, 2000. S.K. Jain for CBS Publishers and Distributors, New Delhi.
17. Ecology Work Book.-- R. Misra 1968. Oxiord and IBH, New Delhi.
18. Ecology and Field Biology.-- R.L. Smith. 1990 (4th edition). Harper Collins New York.
19. College Botany – Dr. B. P. Pandey, S. Chand and Company Ltd. , New Delhi.

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Title of Papers

Subject: Botany Class: B.Sc I

| Semester | Paper No. | Title |
|-----------------|------------------|--|
| I | I (DSC 7 A) | Biodiversity in Cryptogams and Gymnosperms |
| II | II (DSC 7 B) | Plant Ecology and Taxonomy |